S05P1586

DESCRIPTION

IMAGE RECORDING DEVICE AND IMAGE RECORDING-CONTROL METHOD

Technical Field

5　[0001]

The present invention relates to an image-recording
device and particularly relates to an image-recording device
which holds a predetermined menu relating to recorded image
data, an image recording-control method, and a program which

10　makes a computer execute the image recording-control method.

Background Art

[0002]

In recent years, as disk-type recording mediums such as

15　a digital versatile disk (DVD) become widespread, the disk-
type recording medium is increasingly used in place of a
known tape-type recording medium in mobile-image recording
devices such as a digital video camera. The disk-type
recording medium is adaptable to random access. In the

20　image-recording device using the disk-type recording medium,
therefore, recorded image data can be easily reproduced
and/or deleted in predetermined units.

[0003]

In the case of the DVD, a menu screen referred to as a

25　DVD menu is provided, as a user interface which allows for

accessing recorded video data. In the DVD menu,

representative images of the video data are shown in titles

and/or chapters of the DVD, as thumbnails.

[0004]

5   On the other hand, an image-recording device that can

record not only video images but also still images often

holds video data referred to as a photo movie. The photo

movie shows the recorded still images in sequence and

produces predetermined background music at the same time.

10   When the photo movie exists, it is shown as the last video

image of the DVD menu.

[0005]

       Incidentally, the type of a DVD that can record data

includes the DVD - R standard that allows for recording data

15   onto a single area only once, the DVD - RW standard and the

DVD + RW standard that allow for repetitive data rewriting,

and so forth. In the case of the above-described DVD that

can record data, finalization is performed, so as to

generate the DVD menu and the photo movie (For example,

20   refer to Japanese Unexamined Patent Application Publication

No. 2004-201170 (Fig. 7).).

Disclosure of Invention

[0006]

25   After the finalization processing is performed for DVDs

generated under the DVD - R standard and/or the DVD - RW
standard of the data-recordable DVDs, additional image data
cannot be recorded thereon. For recording the additional
image data onto the DVDs generated under the DVD - R

5 standard and/or the DVD - RW standard, unfinalization
processing needs to be performed, so as to undo the
finalization processing.

[0007]

However, according to a video-recording format used for

10 the DVD + RW standard (DVD + RW video-recording format),
additional image data can be recorded thereon after the
finalization processing is performed. Therefore, it is
possible to perform additional recording while the existing
DVD menu and photo movies are left untouched. In that case,

15 a mismatch may occur between the DVD menu and/or the photo
movie, and image data which is actually recorded.
Subsequently, matching of some kind should be performed
between the DVD menu and/or the photo movie, and the image
data, so as to record additional image data onto the disk

20 generated under the DVD + RW standard.

[0008]

Accordingly, an object of the present invention is to
reduce a mismatch that may occur between a DVD menu and/or a
photo movie, and image data in an image-recording device

25 using a disk-type recording medium generated under the DVD +

RW standard.

[0009]

For achieving the above-described object, an image-recording device according to a first aspect of the present invention includes a disk-determination unit which determines whether or not an inserted disk is a subject disk that is of a predetermined type and that stores a predetermined menu, and an additional recording-control unit which makes matching for additionally recorded data performed when the disk-determination unit determines the inserted disk to be the subject disk. Subsequently, when the predetermined menu is recorded onto the disk of the predetermined type, the matching for the additionally recorded data is performed.

[0010]

Further, an image-recording device according to a second aspect of the present invention includes a disk-determination unit which determines whether or not an inserted disk is a subject disk that is of a DVD + RW type and that stores a predetermined menu, and an additional recording-control unit which makes matching for additionally-recorded data performed when the disk-determination means determines the inserted disk to be the subject disk. Subsequently, when the disk type is the DVD + RW and the predetermined menu is recorded onto the disk, the

matching for the additionally recorded data is performed.

[0011]

Further, according to the second aspect, the disk-
determination unit may determine the inserted disk to be the

5   subject disk when a recording format of the inserted disk is
a DVD + RW video-recording format. Subsequently, when the
recording format is the DVD + RW video-recording format, the
matching for the additionally recorded data is performed.

[0012]

10   Further, according to the second aspect, the above-
described predetermined menu may be a DVD menu holding a
list of video data items recorded onto the inserted disk
and/or a photo movie which holds still-image data recorded
onto the inserted disk, as video images. The DVD menu and

15   the photo movie are generated when finalization is performed,
or a user performs operations.

[0013]

Further, according to the second aspect, the above-
described matching is achieved by (a) deleting the

20   predetermined menu when additional data is recorded onto the
inserted disk, (b) updating the predetermined menu on the
basis of the additionally recorded data when the additional
data is recorded onto the inserted disk and an instruction
to take out the disk is issued, (c) updating the

25   predetermined menu on the basis of the additionally recorded

data after confirming that the predetermined menu should be updated when the additional data is recorded onto the inserted disk and an instruction to take out the disk is issued, and so forth.

5 [0014]

Further, an image-recording device according to a third aspect of the present invention includes a disk-determination unit which determines whether or not an inserted disk is a subject disk that is of a DVD + RW type

10 and that stores a predetermined menu, a message display-control unit which makes a display image produced, the display image being adapted to confirm that additional data can be recorded onto the inserted disk when the disk-determination unit determines the inserted disk to be the.

15 subject disk, an operation input-reception unit which receives a confirmation input for the confirmation display image, and an additional recording-control unit which makes matching performed for the additionally-recorded data when the confirmation input indicates that the additional data

20 can be recorded. Subsequently, when the disk type is the DVD + RW and the predetermined menu is recorded onto the disk, the matching for the additionally recorded data is performed after it is confirmed that the additional data can be recorded.

25 [0015]

Further, according to the third aspect, the disk-determination unit may determine the inserted disk to be the subject disk when a recording format of the inserted disk is a DVD + RW-video recording format. Subsequently, the

5 matching for the additionally recorded data is performed when the recording format of the inserted disk the DVD + RW video-recording format.

[0016]

Further, according to the third aspect, the

10 predetermined menu may be a DVD menu holding a list of video data items recorded onto the inserted disk, or a photo movie holding still-image data recorded onto the inserted disk, as video data. The above-described DVD menu and the photo movie are generated when finalization is performed, or a

15 user performs operations.

[0017]

Further, according to the second aspect, the above-described matching is achieved by (a) deleting the predetermined menu unconditionally, (b) deleting the

20 predetermined menu when additional data is recorded onto the inserted disk, (c) updating the predetermined menu on the basis of the additionally recorded data when the additional data is recorded onto the inserted disk and an instruction to take out the disk is issued, (d) updating the

25 predetermined menu on the basis of the additionally recorded

data after confirming that the predetermined menu should be

updated when the additional data is recorded onto the

inserted disk and the instruction to take out the disk is

issued, and so forth.

5   [0018]

Further, according to the third aspect, the message

display-control unit may produce a display image indicating

that the additional recording can be performed when at least

one of the following processing procedures is performed,

10   where the processing procedures include (1) turning on a

power again when the confirmation input indicates that the

additional recording cannot be performed, (2) switching to a

predetermined photographing mode when the confirmation input

shows that the additional recording cannot be performed, and

15   (3) performing a predetermined photographing operation is

performed when the confirmation input shows that the

additional recording cannot be performed.

[0019]

Further, an image-recording device according to a

20   fourth aspect of the present invention includes a disk-

determination unit which determines whether or not an

inserted disk is a subject disk that is of a DVD + RW type

and that stores a predetermined menu, and an additional

recording-control unit which disables additional recording

25   when the disk-determination unit determines the inserted

disk to be the subject disk. Subsequently, when the disk type is the DVD + RW and the predetermined menu is recorded onto the disk, the additional recording is uniformly prohibited.

5 [0020]

Further, according to the fourth aspect, the disk-determination unit may determine the inserted disk to be the subject disk only when a recording format of the inserted disk is a DVD + RW-video recording format. Subsequently,

10 when the recording format is the DVD + RW video-recording format, the matching for the additionally recorded data is performed.

[0021]

Further, an image recording-control method according to

15 a fifth aspect of the present invention includes a step of determining a type of an inserted disk, a step of determining whether or not a predetermined menu is recorded onto the inserted disk, and a step of performing matching for additionally recorded data when it is determined that

20 the type of the inserted disk is DVD + RW and the predetermined menu is recorded onto the inserted disk. Subsequently, when the disk type is the DVD + RW and the predetermined menu is recorded onto the disk, the matching for the additionally recorded data is performed.

25 [0022]

Further, an image recording-control method according to a sixth aspect of the present invention includes a step of determining a type of an inserted disk, a step of determining whether or not a predetermined menu is recorded

5   onto the inserted disk, a step of producing a display image adapted to confirm that additional data can be recorded onto the inserted disk when it is determined that the type of the inserted disk is DVD + RW and the predetermined menu is recorded onto the inserted disk, a step of receiving a

10 confirmation input for the confirmation display image, and a step of performing matching for the additionally-recorded data when the confirmation input indicates that the additional data can be recorded. Subsequently, when the disk type is the DVD + RW and the predetermined menu is

15 recorded onto the disk, the matching for the additionally recorded data is performed after it is confirmed that the additional data can be recorded.

[0023]

Further, a program according to a seventh aspect of the

20 present invention makes a computer execute a step of determining a type of an inserted disk, a step of determining whether or not a predetermined menu is recorded onto the inserted disk, and a step of matching a predetermined menu to additionally recorded data when it is

25 determined that the type of the inserted disk is DVD + RW

and the predetermined menu is recorded onto the inserted

disk. Subsequently, when the disk type is the DVD + RW and

the predetermined menu is recorded onto the disk, the

matching for the additionally recorded data is performed.

5   [0024]

Further, a program according to an eighth aspect of the

present invention makes a computer execute a step of

determining a type of an inserted disk, a step of

determining whether or not a predetermined menu is recorded

10   onto the inserted disk, a step of producing a display image

adapted to confirm that additional data can be recorded onto

the inserted disk when it is determined that the type of the

inserted disk is DVD + RW and the predetermined menu is

recorded onto the inserted disk, a step of receiving a

15   confirmation input for the confirmation display image, and a

step of matching the predetermined menu to the additionally

recorded data when the confirmation input indicates that the

additional data can be recorded. Subsequently, when the

disk type is the DVD + RW and the predetermined menu is

20   recorded onto the disk, the matching for the additionally

recorded data is performed after it is confirmed that the

additional data can be recorded.

Brief Description of the Drawings

25   [0025]

[Fig. 1] Fig. 1 shows an example configuration of an image-recording device 100 according to an embodiment of the present invention.

[Fig. 2] Fig. 2 shows an example functional

5   configuration of the image-recording device 100 according to another embodiment of the present invention.

[Fig. 3] Fig. 3 shows the description of a lead-in area provided on each disk.

[Fig. 4] Fig. 4 shows the description of a control

10   data zone 400.

[Fig. 5] Fig. 5 shows the data structure of a disk generated in the DVD - Video format.

[Fig. 6] Fig. 6 is a flowchart showing determination procedures performed by a disk-determination unit 260

15   according to another embodiment of the present invention.

[Fig. 7] Fig. 7 is a flowchart showing processing procedures performed on the basis of an image recording-control method according to a first embodiment of the present invention.

20   [Fig. 8] Fig. 8 is a flowchart showing a first example of matching performed according to another embodiment of the present invention.

[Fig. 9] Fig. 9 is a flowchart showing a second example of matching performed according to another

25   embodiment of the present invention.

[Fig. 10]   Fig. 10 is a flowchart showing a third example of matching performed according to another embodiment of the present invention.

[Fig. 11]   Fig. 11 is a flowchart showing a fourth example of matching performed according to another embodiment of the present invention.

[Fig. 12]   Fig. 12 shows example transitions of a display image, where the transitions are generated according to an image recording-control method according to a second embodiment of the present invention.

[Fig. 13]   Fig. 13 is a flowchart illustrating processing procedures performed on the basis of the image recording-control method according to the second embodiment of the present invention.

[Fig. 14]   Fig. 14 shows example display images generated according to other embodiment of the present invention.

[Best Mode for Carrying Out the Invention]

[0026]

Next, embodiments of the present invention will be described in detail with reference to the attached drawings.

[0027]

Fig. 1 shows an example configuration of an image-recording device 100 according to an embodiment of the present invention. The above-described image-recording

device 100 includes a camera unit 10, a record-and-reproduce

unit 20, and a control unit 30.

[0028]

The camera unit 10 has an optical block 11, a camera-

5   control unit 12, a signal converter 13, an image-pickup

signal-processing unit 14, a speech-input unit 15, and a

speech signal-processing unit 16. The optical block 11

includes a group of lenses adapted to pick up the image of a

subject, an aperture-adjustment mechanism, a focus-

10   adjustment mechanism, a zoom mechanism, a shutter mechanism,

a flash mechanism, a shake-correction mechanism, and so

forth. Upon receiving a control signal transmitted from the

control unit 30, the camera-control unit 12 generates a

control signal transmitted to the optical block 11. Then,

15   the camera-control unit 12 transmits the generated control

signal to the optical block 11 and performs control

including zoom control, shutter control, exposure control,

and so forth.

[0029]

20   The signal converter 13 includes an image-pickup

element such as a charge-coupled device (CCD) so that an

image is generated on an image-forming face of the image-

pickup element via the optical block 11. Upon receiving an

image-capture-timing signal transmitted from the control

25   unit 30 in response to a shutter operation, the signal

converter 13 converts the subject image generated on the image-forming face into an image-pickup signal and transmits the image-pickup signal to the image-pickup signal-processing unit 14.

5 [0030]

The image-pickup signal-processing unit 14 performs processing including gamma correction, auto gain control (AGC), and so forth for the image-pickup signal on the basis of the control signal transmitted from the control unit 30.

10 Further, the image-pickup signal-processing unit 14 converts the image-pickup signal to an image signal, as a digital signal. The speech-input unit 15 collects data on speech around the subject while photographing is performed. A speech signal transmitted from the speech-input unit 15 is

15 transmitted to the speech-signal processing unit 16. The speech-signal processing unit 16 performs processing including correction and AGC for the speech signal on the basis of the control signal transmitted from the control unit 30. Further, the speech-signal processing unit 16

20 converts the speech signal into a digital signal.

[0031]

The record-and-reproduce unit 20 includes an encoder-and-decoder circuit 21, a disk interface 23, an output-processing unit 24, and a buffer memory 25.

25 [0032]

The encoder-and-decoder circuit 21 has an encoding function, so as to encode and multiplex an image signal, a speech signal, and additional-recording information that are transmitted from the camera unit 10 into compressed data.

5   Further, the encoder-and-decoder circuit 21 has a decoding function, so as to separate the image signal, the speech signal, and the additional-recording information from the compressed data, and decode the image signal, the speech signal, and the additional-recording information. Further,

10   the encoder-and-decoder circuit 21 performs automatic-white balance control, exposure-correction control, magnification control according to digital-zoom magnification, and so forth for the image signal transmitted from the image-pickup signal-processing unit 14 on the basis of the control signal

15   transmitted from the control unit 30.

[0033]

The disk interface 23 writes the compressed data transmitted from the encoder-and-decoder circuit 21 onto a disk 49. Further, the disk interface 23 reads the

20   compressed data from the disk 49 and transmits the compressed data to the encoder-and-decoder circuit 21. Under the control of the control unit 30, the output-processing unit 24 transmits the compressed data transmitted from the encoder-and-decoder circuit 21 to the control unit

25   30 and output terminals 27, 28, and 29. The buffer memory

25 includes an SDRAM or the like and is used, as a work area used for encoding and/or decoding performed by the encoder-and-decoder circuit 21.

[0034]

5   The control unit 30 includes a processing device 31, a read-only memory (ROM) 33, a random-access memory (RAM) 34, an operation-input interface 35 adapted to connect an operation-input unit 41, a display-control unit 36 adapted to connect a display unit 42, a memory-card interface 37

10 into which a memory card 43 is inserted, and a clock circuit 39 adapted to record information about the photographing time that are connected via a system bus 32.

[0035]

    The processing device 31 controls the entire processing

15 performed by the control unit 30 and uses the RAM 34, as a work area. A program adapted to control the camera unit 10 and a program adapted to control recording and reproducing an image signal and/or a speech signal are written into the ROM 33.

20 [0036]

    The operation-input unit 41 connected to the operation-input interface 35 has a plurality of keys including a mode-switch key adapted to switch from a photographing mode to other mode such as a reproducing mode, a zoom-adjustment key,

25 an exposure-adjustment key, a shutter key, a video-

photographing key, a key adapted to adjust a display image

produced on the display unit 42, and so forth. The

operation-input interface 35 transmits an operation signal

transmitted from the operation-input unit 41 to the

5 processing device 31. The processing device 31 determines

which of the above-described keys of the operation-input

unit 41 was operated and performs control processing

according to the determination result.

[0037]

10   The display unit 42 connected to the display-control

unit 36 includes a liquid-crystal display (LCD) or the like

and produces an image of an image signal transmitted from

the camera unit 10 and/or an image signal read from the disk

49 under the control of the processing device 31.

15 [0038]

The memory-card interface 37 writes the compressed data

transmitted from the encoder-and-decoder circuit 21 into the

memory card 43. Further, the memory-card interface 37 reads

the compressed data from the memory card 43 and transmits

20 the compressed data to the encoder-and-decoder circuit 21.

The clock circuit 39 generates time information showing a

year, a month, a day, time, a minute, a second, and so forth.

[0039]

Fig. 2 shows an example functional configuration of an

25 image-recording device 100 according to another embodiment

of the present invention. Here, an image-pickup unit 210,

an additional recording-control unit 220, an additional

recording-mode holding unit 230, a disk-control unit 240, a

disk information-acquisition unit 250, a disk-determination

5   unit 260, a message display-control unit 270, a display unit

280, and an operation input-reception unit 290 are shown, as

functions of the image-recording device 100.

[0040]

The image-pickup unit 210 is adapted to pick up the

10   image of a subject. For example, the image pickup is

achieved by using the camera unit 10 shown in Fig. 1, for

example. The disk-control unit 240 controls writing and

reading data onto/from the disk 49, which is achieved by the

record-and-reproduce unit 20 shown in Fig. 1, for example.

15   The disk information-acquisition unit 250 acquires

information relating to the disk 49 via the disk control

unit 240, which is achieved by the processing device 31

shown in Fig. 1, for example.

[0041]

20   The disk-determination unit 260 determines whether or

not the disk 49 is subjected to matching performed according

to another embodiment of the present invention, which is

achieved by the processing device 31 shown in Fig. 1, for

example. The disk-determination unit 260 determines the

25   type, recording format, and recording state of the disk 49.

More specifically, when the type of the disk 49 is DVD + RW, the recording format of the disk 49 is DVD + RW-video recording format, and a DVD menu and a photo movie are recorded onto the disk 49, the disk 49 is determined to be a

5 disk subjected to the matching performed according to the embodiment of the present invention (Hereinafter referred to as a "subject disk".).

[0042]

The additional recording-control unit 220 performs

10 control when data is additionally recorded onto the disk 49 according to a result of the determination performed by the disk-determination unit 260. The control is achieved by using the processing device 31 shown in Fig. 1, for example. That is to say, the additional recording-control unit 220

15 controls each of the units, so as to perform matching adapted to prevent a mismatch which occurs between the DVD menu and/or the photo movie, and image data recorded onto the disk 49.

[0043]

20 The additional recording-mode-holding unit 230 holds information about a mode relating to the pros and cons of performing additional recording for the disk 49, which is achieved by the RAM 34 shown in Fig. 1, for example. The mode information held in the additional recording-mode-

25 holding unit 230 may be information about a mode adapted to

allow for performing additional recording, or a mode that
does not allow for performing the additional recording. To
which mode a shift should be made may be determined
according to an instruction and/or a permission given by a
5 user. Otherwise, the shift may be made automatically.
[0044]

The message display-control unit 270 makes the display
unit 280 produce a confirmation message generated when the
shift to the mode relating to the pros and cons of
10 performing the additional recording is made, or a message
adapted to confirm that the DVD menu and the photo movie are
updated. The above-described processing is achieved by the
display-control unit 36 shown in Fig. 1, for example. The
display unit 280 produces a message under the control of the
15 message display-control unit 270, which is achieved by the
display unit 42 shown in Fig. 1, for example. The operation
input-reception unit 290 receives an operation input
transmitted from the user, which is achieved by the
operation-input interface 35 shown in Fig. 1, for example.
20 [0045]

Next, the details on determination made by the disk-
determination unit 260 according to another embodiment of
the present invention will be described.
[0046]

25 Fig. 3 shows the contents of a lead-in area of each of

the disks of various types. The disk has a disk-like shape

and the lead-in area on the inner-periphery side thereof.

Addresses are assigned to the lead-in area from the inner-

periphery side. Any of the disks has areas provided thereon

5   in increasing order of size of the address. That is to say,

an initial zone, a reference-code zone, a buffer zone, a

control-data zone, and a buffer zone are provided on the

lead-in area.

[0047]

10   Of the above-described areas, a control-data zone 400

provided in an area extending from "2F200h" (the letter h

represents that the number shown before the letter h is a

hexadecimal digit) to "2FDFFh" stores information about the

disk. The address where the control-data zone 400 is

15   provided is common to all of the disks.

[0048]

Fig. 4 shows the contents of the control-data zone 400.

Referring to Fig. 4(a), the control-data zone 400 includes

physical-format information 410 of 2048 bytes, disk-

20   production information 420 of 2048 bytes, and content-

provider information 430 of 14 × 2048 bytes.

[0049]

Referring to Fig. 4(b), the physical-format information

410 includes disk type-and-version number 411, data size-

25   and-maximum transfer rate 412, disk structure 413, recording

density 414, data-zone assignment 415, a BCA descriptor 416,

and reservation areas 417 and 418. Of the above-described

information items, in the case of the disk type-and-version

number 411 corresponding to the first one byte, high-order

5   four bits represent the disk type and low-order four bits

represent the version number. That is to say, when the

high-order four bits of the disk type-and-version number 411

is shown as "1010b" (the letter b denotes that the number

shown before the letter b is a binary number), the disk type

10 is DVD + RW. If the high-order four bits of the disk type-

and-version number 411 is shown as "0000b", the disk type is

DVD - ROM. Further, if the high-order four bits of the disk

type-and-version number 411 is shown as "0010b", the disk

type is DVD - R.

15 [0050]

Thus, the disk type can be determined by checking the

disk type shown in the physical-format information 410

recorded on the lead-in area and the high-order four bits of

the version number 411.

20 [0051]

Fig. 5 shows a data configuration of a disk generated

in DVD - Video format (DVD + RW-video recording format).

The disk has a disk-like shape and a lead-in area 711 on the

inner-periphery side thereof and a read-out area 715 on the

25 outer-periphery side thereof. Further, a file-system area

712, a management-information area 713, and a data-recording area 714 are provided in that order on an area extending from the inner-periphery side to the outer-periphery side of the disk. The file-system area 712 is managed by a file

5 system and provided, so as to adhere to ISO 9660 and the universal-disk-format (UDF) standard. The management-information area 713 is an area adapted to hold management information used for the entire video contents recorded onto the disk. The data-recording area 714 is an area adapted to

10 hold the contents of each of the video-title sets and the control information thereof. Further, the above-described areas are divided into logical sectors of 2048 bytes.
[0052]

The management-information area 713 holds a video

15 manager (VMG) 730. The VMG 730 includes VMG information (VMGI) 731, a video object set-for-VMG menu (VMGM_VOBS) 732, and VMGI for backup (VMGI_BUP) 734. The VMGI 731 holds management information for each of the titles of video contents and top menu-control information that are recorded

20 onto the disk. The VMGM_VOBS 732 holds data on the top menu. Further, the VMGI_BUP 734 is a backup of the VMGI 731.
[0053]

The data-recording area 714 holds at least one video titles set (VTS) 740. Each VTS 740 includes VTS information

25 (VTSI) 741, a video object set for VTS menu (VTSM_VOBS) 742,

a video object set for titles in a VTS (VTSTT_VOBS) 743, and

VTSI for backup (VTSI_BUP) 744. The VTSI 741 holds

management information and/or control information of each of

chapters of a title included in the video title set, control

5   information of a chapter menu, and so forth. The VTSM_VOBS

742 holds data on the chapter menu. The VTSTT_VOBS 743

holds data on the titles included in the video titles set.

Further, the VTSI_BUP 744 is a backup of the VTSI 741.

[0054]

10   Subsequently, the recording format of the disk can be

determined by checking whether or not the recording format

adheres to the DVD - Video format (DVD + RW-video recording

format). Further, the existence of the DVD menu can be

determined by checking whether or not the VMGM_VOBS 732

15   exists in the VMG 730. Further, the existence of the photo

movie can be determined by checking whether or not the last

title includes the photo movie. That is to say, the

existence of the photo movie can be determined by referring

to the VTSI 741 of the VTS 740, where the VTSI 741

20   corresponds to the last title.

[0055]

Fig. 6 is a flowchart illustrating the determination

steps performed by the disk-determination unit 260 according

to the embodiment of the present invention. First,

25   information about the disk type is acquired (step S901). If

the disk type is not the DVD + RW, it is determined that the
disk should not be subjected to the matching (step S902).
Further, if the disk type is the DVD + RW, information about
the recording format thereof is acquired (step S903). If
5 the result does not show that the recording format adheres
to the DVD + RW-video recording format, it is determined
that the disk should not be subjected to the matching (step
S904).

[0056]

10   Then, if the recording format adheres to the DVD + RW-
video recording format, information about the disk state is
further acquired (step S905). If the DVD menu and/or the
photo movie is not recorded onto the disk, it is determined
that the disk should not be subjected to the matching.
15 Otherwise, the disk is determined to be the subject of the
matching (step S906).

[0057]

      Next, a first embodiment of an image recording-control
method of the present invention will be described.

20 [0058]

      Fig. 7 is a flowchart showing processing procedures
performed on the basis of the image recording-control method
according to the first embodiment of the present invention.
In the disk-determination unit 260 according to the
25 embodiment of the present invention, it is determined

whether or not the inserted disk 49 is the subject disk that
is of the predetermined type (namely, the DVD + RW standard)
and in the predetermined format (the DVD - video format),
and that stores a predetermined menu (the DVD menu and/or

5   the photo movie) (step S911), as described with reference to
Fig. 6.   If the disk is not determined to be the subject
disk then, the remainder of the processing procedures is not
performed.
[0059]

10   On the other hand, if the disk is determined to be the
subject disk, at step S911, a shift to a mode that allows
for performing additional recording is made (step S917).
More specifically, in the additional recording-mode holding
unit 230, settings are made so that the mode that allows for

15   performing the additional recording is selected.   Then, the
matching is performed under the control of the additional
recording-control unit 220 (step S918).   The matching can be
modified in various ways, as described below.
[0060]

20   Fig. 8 is a flowchart showing a first example of the
matching according to the embodiment of the present
invention.   According to the first example of the matching,
the DVD menu and the photo movie are deleted unconditionally
(step S935), so as to reduce a mismatch which occurs between

25   the DVD menu and/or the photo movie, and the recorded image.

According to the first example, however, the DVD menu and
the photo movie are deleted irrespective of whether or not
the additional recording is performed, which may cause a
trouble in some cases. Therefore, according to a second

5   example of the matching, the DVD menu and the photo movie
are not deleted until the additional recording is actually
performed.
[0061]

Fig. 9 is a flowchart illustrating the second example

10   of the matching according to the embodiment of the present
invention. According to the second example of the matching,
the action of the additional recording is waited for even
after shifting to the matching (step S941). The DVD menu
and the photo movie are deleted after the additional

15   recording is actually performed (step S945). Subsequently,
the DVD menu and the photo movie can be deleted only when
the additional recording is actually performed.
[0062]

Fig. 10 is a flowchart illustrating a third example of

20   the matching according to the embodiment of the present
invention. According to the third example of the matching,
the image-recording device 100 waits until the additional
recording is performed even after the image-recording device
100 shifts to the matching (step S951), as is the case with

25   the second example shown in Fig. 9. Further, even though

the additional recording is performed, the processing is not

performed until the disk for which the additional recording

is performed is taken out, that is, ejected (step S952).

Then, when the disk is taken out after data is additionally

5   recorded, the DVD menu and the photo movie are updated so

that the contents thereof agree with those of the

additionally recorded data (step S955).

[0063]

Fig. 11 is a flowchart illustrating a fourth example of

10 the matching according to the embodiment of the present

invention. According to the fourth example of the matching,

the processing is not performed until the disk is taken out,

even though the additional recording was performed, as is

the case with the third example shown in Fig. 10 (steps S961

15 and S962). Then, when the disk is taken out after the

additional recording was performed, the message display-

control unit 270 makes the display unit 280 produce a

message adapted to determine the pros and cons of updating

the DVD menu and the photo movie (step S963). Information

20 about details on determination performed by the user is

received by the operation input-reception unit 290 and the

confirmation-detail information indicates "to update", the

DVD menu and the photo movie are updated so that the

contents thereof agree with those of the additionally

25 recorded data (step S965). On the other hand, if the

confirmation-detail information indicates "not to update",

the update is not performed. In that case, the user updates

the DVD menu and the photo movie by operating the menu, for

example, at a later date. Otherwise, a mismatch occurs

5 between the DVD menu and the photo movie, and the recorded

image.

[0064]

Next, an image recording-control method according to a

second embodiment of the present invention will be described.

10 [0065]

Fig. 12 is a flowchart illustrating example transitions

of a display image, where the example transitions are made

on the basis of the image recording-control method according

to the second embodiment of the present invention.

15 According to the first embodiment described with reference

to Fig. 7, if the disk is the subject disk, the shift to the

additional recording-capable mode is made unconditionally.

However, the second embodiment is different from the first

embodiment in that the user determines the pros and cons of

20 shifting to the additional recording-capable mode.

[0066]

Namely, when it is confirmed that the disk is the

subject disk, a message screen 810 configured to determine

the pros and cons of shifting to the additional recording-

25 capable mode is produced. If the shift to the additional

recording-capable mode is confirmed, a screen 840 showing
the state of being shifted to the additional recording-
capable mode is produced after a confirmation message screen
820 is produced again, and a screen 850 indicating that the

5   shift is completed is produced. After the shift to the
additional recording-capable mode is achieved, a screen 860
indicating the standby state, or a screen 870 indicating
that recording is being performed when a recording operation
is performed is produced.

10 [0067]

On the other hand, when the shift to the additional
recording-capable mode is rejected in the confirmation
screens 810 and 820, a screen 830 is produced, so as to
indicate that the additional recording is prohibited. If

15 the power is turned off and the turned again in the above-
described state, the message screen 810 adapted to confirm
the pros and cons of shifting to the additional recording-
capable mode is produced again. Further, if the operation
input-reception unit 290 receives an instruction to switch

20 between photographing modes including a video-photographing
mode, a still image-photographing mode, an external-input
mode, a disk-photographing mode, a memory-photographing mode,
and so forth, the message screen 810 adapted to confirm the
pros and cons of shifting to the additional recording-

25 capable mode is produced again. Further, if the operation

input-reception unit 290 is informed that a video recording-
start button, a still image-photographing button, and/or an
external input-image recording button are pressed down, the
message screen 810 adapted to confirm the pros and cons of
5   shifting to the additional recording-capable mode is
produced again.

[0068]

Fig. 13 is a flowchart illustrating processing
procedures performed on the basis of the image recording-
10   control method according to the second embodiment of the
present invention. In the disk-determination unit 260
according to the embodiment of the present invention, it is
determined whether or not the inserted disk 49 is the
subject disk that is of the predetermined type (namely, the
15   DVD + RW standard) and in the predetermined format (the DVD
+ video format), and that stores a predetermined menu (the
DVD menu and/or the photo movie) (step S921). If the disk
is not determined to be the subject disk then, the remainder
of the processing procedures is not performed.

20   [0069]

On the other hand, if the disk is determined to be the
subject disk, at step S921, the message display-control unit
270 makes the display unit 280 produce an image of a message
used for determining the pros and cons of shifting to the
25   additional recording-capable mode (step S922). Information

about details on the determination performed by the user is

received by the operation input-reception unit 290 (step

S923) and the confirmation-detail information indicates "to

shift", the shift to the additional recording-capable mode

5   is made (step S927). More specifically, in the additional

recording-mode holding unit 230, settings are made so that

the mode allows for performing the additional recording.

Then, the matching is performed under the control of the

additional recording-control unit 220 (step S928). The

10   matching is the same as that performed at step S918 shown in

Fig. 7 and can be modified in various ways, as has been

described with reference to Figs. 8 to 11.

[0070]

On the other hand, if the confirmation-detail

15   information indicates "not to shift", at step S923, the

additional recording is prohibited. In that case, however,

if the power is turned off for a time and the turned again

(step S924), a message adapted to determine the pros and

cons of shifting to the additional recording-capable mode is

20   produced again (step S922). Further, if the operation

input-reception unit 290 receives the instruction to switch

between photographing modes including the video-

photographing mode, the still image-photographing mode, the

external-input mode, the disk-photographing mode, the

25   memory-photographing mode, and so forth, (step S925), the

message adapted to determine the pros and cons of shifting

to the additional recording-capable mode is produced again

(step S922). Further, if the operation input-reception unit

290 is informed that the video recording-start button, the

5   still image-photographing button, and/or the external input-

image recording button are pressed down (step S926), the

message adapted to determine the pros and cons of shifting

to the additional recording-capable mode is produced again

(step S922).

10   [0071]

Thus, unlike the first embodiment wherein the DVD menu

and the photo movie are deleted unconditionally, the second

embodiment allows for performing the matching after the user

determines the pros and cons of shifting to the additional

15   recording-capable mode. Therefore, it becomes possible to

reduce data deletion unexpected by the user.

[0072]

Further, according to the embodiments of the present

invention, the DVD menu and the photo movie are deleted

20   and/or updated, so as to reduce a mismatch between the DVD

menu and the photo movie, and the recorded image. Without

being limited to the above-described embodiments, the

present invention may reduce the mismatch by using other

methods. For example, the mismatch can be reduced by

25   providing a simple-operation mode so that the additional

recording for the subject disk is uniformly prohibited.
That is to say, as shown in Fig. 14, information indicating
that recording is prohibited all the time when the DVD menu
and the photo movie are recorded may be shown, and

5   information indicating that the recording is prohibited when
the record button is pressed down may be shown. In that
case, the user manually deletes the DVD menu and the photo
movie so that the additional recording can be performed.
[0073]

10   Further, each of the embodiments of the present
invention shows an example adapted to epitomize the present
invention, and there are correspondences between the
embodiments and items determining the present invention,
where the items fall within the scope of claims of the

15   present invention. However, without being limited to the
correspondences, the embodiments may be modified in various
ways without leaving the spirit of the present invention.
[0074]

     Namely, in the case of Claims 1, 2, and 20, disk-

20   determination means corresponds to the disk-determination
unit 260, for example. Further, additional recording-
control means corresponds to the additional recording-
control unit 220, for example.
[0075]

25   Further, in the case of Claim 8, message display-

control means corresponds to the message display-control

unit 270, for example. Further, operation input-reception

means corresponds to the operation input-reception unit 290,

for example.

5   [0076]

     Further, in the case of Claim 9, disk-determination

means corresponds to the disk-determination unit 260, for

example. Further, additional recording-control means

corresponds to the additional recording-control unit 220,

10   for example. Further, message display-control means

corresponds to the message display-control unit 270, for

example. Further, operation input-reception means

corresponds to the operation input-reception unit 290, for

example.

15   [0077]

     Further, in the case of Claim 9, disk-determination

means corresponds to the disk-determination unit 260, for

example. Further, additional recording-control means

corresponds to the additional recording-control unit 220,

20   for example.

     [0078]

     Further, in the case of Claim 22 and/or Claim 24, a

step for determining the type of an inserted disk

corresponds to step S902, for example. Further, a step for

25   determining whether or not a predetermined menu is recorded

onto the inserted disk corresponds to step S906, for example.
Further, step S918 corresponds to a step for performing
matching for additionally recorded data if the type of the
inserted disk is DVD + RW and the predetermined menu is
5   recorded onto the inserted disk, for example.

[0079]

Further, in the case of Claim 23 and/or Claim 25, a
step for determining the type of an inserted disk
corresponds to step S902, for example. Further, a step for
10   determining whether or not a predetermined menu is recorded
onto the inserted disk corresponds to step S906, for example.
Further, step S922 corresponds to a step for producing a
confirmation display image indicating that data can be
additionally recorded onto the inserted disk if it is
15   determined that the type of the inserted disk is DVD + RW
and the predetermined menu is recorded onto the inserted
disk, for example. Further, a step for receiving a
confirmation input for the confirmation display image
corresponds to step S923, for example. Further, step S928
20   corresponds to a step for performing matching for the
additionally recorded data if the confirmation input
indicates that the additional recording can be performed,
for example.

[0080]

25   Further, the processing procedures described in the

embodiments of the present invention may be construed as a method including the above-described series of procedures. Further, the processing procedures may be construed as a program adapted to make a computer execute the above-

5   described series of procedures and/or a recording medium storing the program.

[0081]

In the image-recording device using a disk-type recording medium generated under the DVD + RW standard, the

10 present invention can produce the effect of reducing a mismatch which may occur between video data generated by using the DVD menu and/or the still-image data recorded onto the disk, and the image data.

15 Industrial Applicability

[0082]

As an example utilization of the present invention, in the case of an image-recording device using a disk-type recording medium generated under the DVD + RW standard or

20 the like, the present invention can be used for performing additional recording after video data is generated by using a DVD menu and/or still-image data recorded onto the disk, for example.